

Yale University
EliScholar – A Digital Platform for Scholarly Publishing at Yale

Public Health Theses

School of Public Health

January 2014

Investigating The Link Between Food Insecurity And Disturbances In Eating And Mood

Tayla Radean Ash

Yale University, tayla.ash@yale.edu

Follow this and additional works at: <http://elischolar.library.yale.edu/ysphtdl>

Recommended Citation

Ash, Tayla Radean, "Investigating The Link Between Food Insecurity And Disturbances In Eating And Mood" (2014). *Public Health Theses*. 1014.

<http://elischolar.library.yale.edu/ysphtdl/1014>

This Open Access Thesis is brought to you for free and open access by the School of Public Health at EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Public Health Theses by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.

Investigating the Link Between Food Insecurity and Disturbances in
Eating and Mood

Tayla Ash

April 2014

ABSTRACT

Food insecurity, the limited or uncertain availability of food, is paradoxically associated with overweight and obesity in the United States. Mechanisms for this are not well understood, but it is hypothesized that unstable food supply leads to disordered eating, such as binge eating, predisposing individuals to obesity. The current study explored both eating and mood disturbances in the context of food insecurity. The primary hypothesis was that food insecurity would be positively associated with both weight and shape concern. Binge eating, depression, and emotional eating were secondary variables of interest. Participants were 276 community volunteers who completed online surveys. The prevalence of food insecurity in the sample was 48.2%. T-tests and correlations revealed significant positive associations for all variables as hypothesized, except binge eating. Regression models indicated that depression mediated the relationship between food insecurity and weight and shape concern. Associations were only significant among females. Considering the elevated eating and mood disturbances experienced by food insecure women, interventions targeted at this group should aim to take a holistic approach.

TABLE OF CONTENTS

INTRODUCTION.....	4
METHODS.....	6
Participants.....	6
Procedure.....	7
Assessments and Measures.....	7
Data Analysis.....	10
RESULTS.....	10
Table 1. Results of individual food insecurity items.....	11
Table 2. Demographics between food secure and food insecure groups.....	12
Table 3. Primary and exploratory means analyses.....	13
Table 4. Correlation matrix for variables of interest.....	14
Table 5. Regression controlling for gender, BMI, and BDI.....	14
Table 6. Regression controlling for gender, BMI, and BDI separately.....	15
Table 7. Correlations of Food Insecurity across gender groups.....	15
DISCUSSION.....	16
REFERENCES.....	18
APPENDIX- Survey Items.....	22

INTRODUCTION

Despite the prosperity of the United States as one of the wealthiest countries in the world, 14.5% of U.S. households reported experiencing food insecurity at some point during 2010[1]. This is a significant increase from 10.1% in 1999[2]. As defined by the U.S. Department of Agriculture, food insecurity refers to “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways”[3]. The consequences of experiencing food insecurity are not only vast, spanning multiple aspects of well being, but can also be extremely severe in magnitude, and can therefore be detrimental to both one’s health and quality of life[4]. While the psychological experience of food insecurity involves worry, anxiety, stress, and alienation[5], the physical consequences are centered on mal- or inadequate nutrition. Ironically though, instead of food insecurity logically leading its victims to be underweight, in the United States food insecurity is paradoxically associated with overweight and obesity.

Reviews by Dinour et al. [6] and Larson et al. [7] conclude that food insecurity is associated with elevated BMI, particularly among adult females. Hypothesized reasons for this paradox are that: 1) food insecurity disproportionately affects demographic groups that are at the highest risk for obesity through various pathways including genetic[7], 2) food insecure households are characterized by low levels of education and physical activity[8], 3) food insecure individuals are more likely to consume low-cost energy dense foods given resource restriction[8], and 4) food insecurity fosters disordered eating behaviors

such as binge eating due to inconsistent food accessibility and availability, predisposing them to obesity[9, 10].

Despite research in this area being in its infancy, two studies have explored the latter of these hypotheses, both providing evidence that disordered, or binge eating, is associated with food insecurity[9, 11]. Understanding the mechanisms by which food insecurity is linked to disordered eating is fundamental in addressing the food insecurity-obesity paradox. The present study takes on this novel approach, investigating psychological correlates of weight gain and disordered eating that occur in the context of food insecurity. Variables of interest include weight concern, shape concern, depression, and the frequency of “emotional eating,” or eating in response to negative emotions.

While no published study has linked the aforementioned variables to food insecurity specifically, some research has explored correlates of eating pathology, such as self-esteem and body concerns, in the context of low socioeconomic status (SES). Studies by Abel et al. [12] and O’Dea and Caputi [13] found that SES was positively associated with self-esteem and body image, such that high SES was associated with better self-esteem and body image. Similar findings have been published for satisfaction and pride in one’s body, again with high SES being associated with greater satisfaction and pride [14, 15]. Only one study has reported the association between SES and weight concern, or maladaptive concern, or preoccupation about body weight. Story et al. [15] reported that SES was inversely

associated with weight concern, such that lower SES individuals reported elevated concerns about their weight after controlling for BMI.

Given these findings, it was hypothesized that in the current study food insecurity would be positively associated with both weight and shape concerns. Exploratory analyses were also employed to examine the relationships among food insecurity, binge eating, depression, and emotional eating. Depression and emotional eating have been etiologically tied to binge eating [16-18], but no literature exists on how these variables relate to each other as a function of food insecurity. It was hypothesized that food insecurity would be positively associated with both depression and emotional eating.

METHODS

Participants

Participants were 276 male and female community volunteers who responded to an online advertisement, seeking volunteers for a research project assessing various aspects of eating and dieting behaviors. Advertisements, which contained a link to an external web survey, were posted online in the classified ad section on Craigslist for an assortment of U.S. cities. Advertisements also appeared on Google banners when the following combinations of keywords were entered in the search box: weight gain, body image, binge eating, compulsive eating, obesity, obesity epidemic, obesity test, obesity studies, obesity quiz, weight questionnaire, weight quiz, weight studies, eating test, and eating questionnaire.

The gender distribution of the sample was 83.0% (n=229) female, 16.3% (n=45) male, and 0.7% (n=2) missing. The racial/ethnic distribution of the sample was 73.6% (n=203) white, 9.4% (n=26) Hispanic, 8.0% (n=22) black (non-Hispanic), 4.7% (n=13) Asian, 3.6% (n=10) other, and 0.7% (n=2) missing. The distribution for highest level of education was as follows: 1.5% (n=4) some high school, 11.2% (n=31) high school graduate or equivalency, 33.3% (n=92) some college or associate degree, 40.6% (n=112) completed college, 13.0% (n=36) completed graduate degree, and 0.4% (n=1) missing. Participants were required to be 18 years of age; the mean age was 34.85 ± 13.92 years. The mean body mass index (BMI) was $28.54 \pm 9.07 \text{ kg/m}^2$.

Procedure

Self-reported surveys were administered through SurveyMonkey, a research-based data gathering website with secure 128-bit data encryption. In order to access the survey questions, participants were first required to provide informed consent via a checkbox. Upon completion, participants had an opportunity to enter a drawing for a 1 in 20 chance to win a \$50 gift certificate. No personal identifying information was collected, and the study was reviewed and approved by the institutional review board.

Assessments and Measures

Participants provided basic demographic information, as well as self-reported height and weight. Exposures and outcomes were assessed using a battery of self-report measures:

- *U.S. Household Food Security Survey Module: Six-Item Short Form*— developed by researchers at the National Center for Health Statistics, and last revised by the USDA's Economic Research Service in 2012, aims to identify low and very low food secure households. Food security status is assigned based on raw score; a score of 0-1 is considered high food security (labeled food secure in this study), 2-4 low food security (labeled moderate food insecurity in this study), and 5-6 very low food security (labeled severe food insecurity in this study). The following responses are interpreted as affirmative and coded as 1: often, sometimes, almost every month, and some months but not every month. Reasonably high specificity and sensitivity have been shown for this scale relative to the standard 18-item scale [19]. In this study food insecurity was considered as a continuous variable with each participant being assigned a composite score based on the collective responses of each of the six items, as is the recommended practice.
- *Eating Disorder Examination Questionnaire (EDE-Q)*— created by Fairburn and Cooper in 1993, is the self-report version of the Eating Disorder Examination [20]. The EDE-Q assesses the occurrence of an array of eating disorder features including objective and subjective binge eating, purging, and dietary restraint, over the past 28 days. It also includes subscales for eating, shape concern, weight concern, dietary restraint, and measures distress associated with overeating and loss of control. The EDE-Q has received psychometric support in regards to test-retest reliability and good convergence with the EDE [21-24]. The majority of the variables of interest

in this study come directly from the EDE-Q including weight concern, shape concern, and occurrence and frequency of binge eating. The range of possible scores on the shape and weight concerns subscales is 0 to 6, with higher scores indicating a higher degree of disturbance in these domains.

- Emotional Overeating Questionnaire (EOQ). The EOQ measures the frequency of overeating in response to various emotions (e.g., loneliness, anger, and sadness) over the previous 28 days [25]. It employs the same response format as the EDE-Q and has demonstrated psychometric properties among community samples and clinical samples diagnosed with binge eating disorder. As with the EDE-Q subscales, the range of possible scores is 0 to 6, with higher scores indicating a greater frequency of eating in response to negative emotions. The present study looked specifically at eating in response to the following emotions: anger, guilt, and sadness.
- *Beck Depression Inventory* (BDI)— derived from clinical attitude and behavior observations frequently displayed by depressed patients, Beck and colleagues created this measure in 1961 [25]. The measure rates the intensity (from 0 to 3) of 21 symptoms and attitudes: mood, pessimism, sense of failure, lack of satisfaction, guilt feelings, sense of punishment, self-dislike, self-accusation, suicidal wishes, crying, irritability, social withdrawal, indecisiveness, distortion of body image, work inhibition, sleep disturbance, fatigability, loss of appetite, weight loss, somatic preoccupation, and loss of libido. The BDI is widely used and has consistently shown both excellent

reliability and validity. Total BDI score, which combines the intensity of each of the 21 items, was one of the variables of interest in the present study. The range of possible scores on the BDI is 0 to 63, with higher scores indicating greater depressive symptomatology.

Data Analysis

All of the variables of interest were coded in a continuous manner, thus means analyses (t-tests) and linear regression were the methods of analysis used. Despite food insecurity being the only predictor variable, multiple linear regression was used to adjust for potential confounders and mediators. Dummy variables were created for the variables of race/ethnicity and gender since they are categorical. Pearson correlations were also conducted to test for relationships among the variables given the exploratory nature of the study.

RESULTS

The BMI distribution of the sample was 8.3% (n=23) underweight (<18.5), 34.1% (n=94) normal weight (18.5-24.9), 23.2% (n=64) overweight (25-29.9), 32.6% (n=90) obese (30+), and 1.8% (n=5) missing. The prevalence of having at least some level of food insecurity in the sample was considerably high at 48.2% (n=133). Table 1 displays the results for each of the 6 items measuring food insecurity.

Table 1. Results of individual food insecurity items

Item: In the past 12 months...				
	Often true	Sometimes True	Never True	Missing
1. I couldn't afford to eat balanced meals.	60 (21.7%)	86 (31.2%)	130 (47.1%)	
2. The food I bought just didn't last, and I didn't have money to get more.	55 (20.0%)	71 (25.7%)	150 (54.3%)	
3. Did you (or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?	Yes	No		
	98 (35.5%)	178 (64.5%)		
	Almost every month	Some months but not every month	In only one or two months	
4. How often did this happen?	50 (18.1%)	37 (13.4%)	76 (27.5%)	113 (41.0%)
5. Did you ever eat less than you felt you should because there wasn't enough money to buy food?	Yes	No		
	93 (33.7%)	181 (65.6%)		2 (0.7%)
6. Were you ever hungry but didn't eat because you couldn't afford enough food?	76 (27.5%)	199 (n=72.1%)		1 (0.4%)

Among those categorized as food insecure, moderate food insecurity (score of 2-4) was reported by 20.7% (n=57) with severe food insecurity (score of 5-6) being reported by 27.5% (n=76) of the sample. Comparing demographics between those qualifying as food secure (score 0-1) and those qualifying as food insecure (score 2-6), individuals experiencing food insecurity were more likely to belong to an ethnic/racial minority group, be slightly younger in age, have a lower level of education ($p<0.01$), and have a slightly higher BMI. See Table 2 for percentages and means.

Table 2. Demographics between food secure and food insecure groups

	Food Secure (n=143)	Food Insecure (n=133)	Total Sample (n=276)	Test Statistics
Gender				$\chi^2(1, n=274)=1.061$, $p=0.303$
<i>Male</i>	14.0% (n=20)	18.8% (n=25)	16.3% (n=45)	
<i>Female</i>	84.6% (n=121)	81.2% (n=108)	83.0% (n=229)	
<i>Missing</i>	1.4% (n=2)		0.7% (n=2)	
Race/Ethnicity				$\chi^2(4, n=274)=7.617$, $p=0.107$
<i>White</i>	79.0% (n=113)	67.7% (n=90)	73.6% (n=203)	
<i>Black (non-Hispanic)</i>	4.2% (n=6)	12.0% (n=16)	8.0% (n=22)	
<i>Hispanic</i>	7.7% (n=11)	11.3% (n=15)	9.4% (n=26)	
<i>Asian</i>	4.2% (n=6)	5.3% (n=7)	4.7% (n=13)	
<i>Other</i>	3.5% (n=5)	3.7% (n=5)	3.6% (n=10)	
<i>Missing</i>	1.4% (n=2)		0.7% (n=2)	
Age	35.71 \pm 14.73	33.89 \pm 12.95	34.85 \pm 13.92	$t(256)=1.026$, $p=0.306$
BMI	27.00 \pm 8.39	29.44 \pm 9.70	28.54 \pm 9.07	$t(270)=-1.587$, $p=0.114$
Education				$\chi^2(4, n=275)=20.522$, $p=0.000$
<i>Some high school</i>	0.0% (n=0)	3.0% (n=4)	1.5% (n=4)	
<i>High school graduate or equivalency</i>	6.3% (n=9)	16.5% (n=22)	11.2% (n=31)	
<i>Some college or associate degree</i>	28.0% (n=40)	39.1% (n=52)	33.3% (n=92)	
<i>Completed college</i>	49.0% (n=70)	31.6% (n=42)	40.6% (n=112)	
<i>Completed graduate degree</i>	16.0% (n=23)	9.8% (n=13)	13.0% (n=36)	
<i>Missing</i>	0.7% (n=1)		0.4% (n=1)	

Note: Food Secure households reported a score of 0 or 1 on the U.S. Household Food Security Survey Module: Six-Item Short Form. Food Insecure Households reported a score of 2-6.

The primary hypothesis of the study was that food insecurity would be associated with weight and shape concern, such that food insecurity would predict higher scores on these clinical measures. This relationship was examined using t-tests for categorical food security status, and with partial Pearson correlation coefficients. The results for the t-tests are presented in Table 3, with food insecurity being significantly associated with both increased weight and shape concern

($p < 0.01$) as expected. Exploratory analysis investigated the association between food insecurity and binge eating, depressive symptoms, and eating in response to negative emotions. No significance was found for binge eating, however food insecurity was significantly associated with BDI scores and eating in response to all three negative emotions (anger, guilty, sadness) at $p < 0.01$.

Table 3. Primary and exploratory means analyses

	Food Secure (n=143)	Food Insecure (n=133)	Total Sample	Test Statistics
Weight Concern	2.56 ± 1.60	3.14 ± 1.67	2.84 ± 1.66	t(274)=- 2.948, p=0.003
Shape Concern	3.05 ± 1.67	3.67 ± 1.70	3.35 ± 1.71	t(274)=- 3.054, p=0.002
Binge Eating	3.25 ± 11.21	3.67 ± 7.38	3.45 ± 9.56	t(272)=- 0.363, p=0.717
BDI	12.74 ± 9.88	19.88 ± 12.43	16.18 ± 11.72	t(274)=- 5.296, p=0.000
Anger	0.77 ± 1.47	1.42 ± 1.95	1.08 ± 1.75	t(267)=- 3.126, p=0.002
Guilt	0.69 ± 1.46	1.43 ± 2.08	1.05 ± 1.82	t(273)=- 3.426, p=0.001
Sadness	1.06 ± 1.53	1.79 ± 1.92	1.41 ± 1.76	t(272)=- 3.456, p=0.001

Note: Food Secure households reported a score of 0 or 1 on the U.S. Household Food Security Survey Module: Six-Item Short Form. Food Insecure Households reported a score of 2-6.

Table 4 displays the Pearson correlation coefficient matrix for all of the variables of interest, looking at food insecurity as a continuous variable, as opposed to a categorical one. All of the variables were significantly correlated with one another except food insecurity and binge eating.

Table 4. Correlation matrix for variables of interest

	Food Insecurity	Weight Concern	Shape Concern	Binge Eating	BDI	Anger	Guilt	Sadness
Food Insecurity	1							
Weight Concern	0.150*	1						
Shape Concern	0.144*	0.902**	1					
Binge Eating	0.012	0.359**	0.312**	1				
BDI	0.282**	0.533**	0.311**	0.298**	1			
Anger	0.144*	0.458**	0.557**	0.322**	0.381**	1		
Guilt	0.136*	0.454**	0.397**	0.358**	0.407**	0.742**	1	
Sadness	0.130*	0.542**	0.475**	0.414**	0.493**	0.694**	0.673**	1

Controlling for gender, race, and body mass index; * correlation is significant at the 0.05 level (2-tailed); ** correlation is significant at the 0.01 level (2-tailed)

Following initial analyses, several multiple linear regressions were run to further investigate the unique effect of food insecurity on weight concern and shape concern. Controlling for gender, BMI, and BDI, food insecurity was no longer significantly associated with weight and shape concern. See Table 5. Separate regressions for each of these variables revealed that BDI was responsible for this diminished significance, as depicted in Table 6.

Table 5. Regression controlling for gender, BMI, and BDI

	B	Std. Error	Sig.
Shape Concern			
<i>Gender</i>	0.933	0.217	0.000
<i>BMI</i>	0.045	0.009	0.000
<i>BDI</i>	0.076	0.007	0.000
<i>Food Insecurity</i>	0.002	0.025	0.943
Weight Concern			
<i>Gender</i>	0.874	0.214	0.000
<i>BMI</i>	0.048	0.009	0.000
<i>BDI</i>	0.068	0.007	0.000
<i>Food Insecurity</i>	0.009	0.025	0.706

Table 6. Regression controlling for gender, BMI, and BDI separately

	<i>Food Insecurity</i>
--	------------------------

	B	Std. Error	Sig.	B	Std. Error	Sig.
Shape Concern						
<i>Gender</i>	0.975	0.270	0.000	0.102	0.030	0.001
<i>BMI</i>	0.064	0.011	0.000	0.070	0.029	0.015
<i>BDI</i>	0.083	0.008	0.000	0.005	0.026	0.838
Weight Concern						
<i>Gender</i>	0.928	0.261	0.000	0.102	0.029	0.000
<i>BMI</i>	0.065	0.010	0.000	0.071	0.028	0.010
<i>BDI</i>	0.076	0.008	0.000	0.014	0.026	0.591

Given gender difference findings in previous studies, correlations were also run separately for males and females. Results reveal very different patterns of association for food insecurity, weight and shape concern, and depression across gender groups with significant links only being present among females. See Table 7.

Table 7. Correlations of Food Insecurity across gender groups

	Females	Males
Weight Concern	0.161*	0.102
Shape Concern	0.182**	-0.023
Binge Eating	-0.009	0.232
BDI	0.307**	0.158
Anger	0.183**	-0.096
Guilt	0.176**	-0.048
Sadness	0.135*	0.083

Controlling for race/ethnicity and BMI; ** correlation is significant at the 0.01 level (2-tailed); * correlation is significant at the 0.05 level (2-tailed)

DISCUSSION

Analyses revealed that in this population, food insecurity was significantly associated with shape concern, weight concern, depression, and eating in response to negative emotions. Food security was associated with low shape/weight concern and negative affect, whereas as food insecurity was associated with elevated shape/weight concern and negative affect. Further analyses via regression revealed that after controlling for BDI score, significance was diminished. Depression then, mediated the link between food insecurity and the other variables. In looking at males and females separately, significant correlations between food insecurity and the other variables of interest were only present among females. Collectively, these findings suggest that depression plays a pivotal role in the elevated eating and mood disturbances experienced by food insecure females, making it a plausible explanation for the food insecurity-obesity paradox. No conclusions can be drawn for males.

Limitations of this study include the relatively modest sample size. It is possible that the diminished significance between food insecurity and the other variables by depression was a power problem, specifically for males. Another plausible explanation is a simple problem of multicollinearity. An additional limitation to the study exists pertaining to generalizability, as the sample was predominately white. Further studies should aim to recruit a more racially diverse sample. Further studies should also aim to recruit more males. While self reported height and weight is also a possible limitation of this study, it is of little concern given the high correlation between self-reported and measured height and weight [26, 27].

Strengths of the present include its novelty, the use of a variety of psychometrically sound measures of eating-specific and general mood symptoms, and the range of scores for the food insecurity measure. The prevalence of food insecurity in this study (48.2%) was much higher than the 2010 national prevalence (14.5%). Possible explanations for this include the imbalanced gender breakdown of the sample, the fact that there was a chance to win money for completing the survey, and that Craigslist attracts a particular population. Ironically though, the sample was actually more educated than the general U.S. population [28].

Given that those experiencing food insecurity have higher a rate of obesity than those who are food secure [6, 7], efforts to encourage healthy eating and lifestyle practices need to be made that target this population. Some efforts are already underway, such as the restructuring of the federal food stamps program into the Supplemental Nutrition Assistance Program. However promoting and enabling healthy choices is not enough. As indicated by the results of this study, mental health has great influence over how one feels about body size and shape, which is likely to influence eating practices. Considering how stress and depression impact eating, and how depression rates are highest among low-income and usually food insecure individuals [29], interventions that target these populations should aim to take a holistic approach, touching on all realms that play into both one's ability and willingness to make healthier choices.

REFERENCES

1. *Guide to Measuring Household Food Security*. U.S. Department of Agriculture 2001; Available at:
<http://www.ers.usda.gov/briefing/foodsecurity/surveytools/index.htm>
Accessed February 15, 2014.
2. Nord, M., Andrews, M., and Carlson, S. *Household food security in the United States*. Economic Research Report 2004 [cited 11; Available from: Available at: <http://www.ers.usda.gov/publications/err11/err11.pdf>. Accessed March 4, 2014.
3. Bickel G, N.M., Price C, Hamilton W, and Cook J. *Guide to measuring household food security*. Food Nutr Serv, 2000.
4. CC, C. *Food Insecurity: A Nutritional Outcome or a Predictor Variable?* Journal of Nutrition, 1991: p. 408-415.
5. McCurdy, K. and K.S. Gorman. *Measuring family food environments in diverse families with young children*. Appetite, 2010. **54**(3): p. 615-8.
6. Dinour, L.M., D. Bergen, and M.C. Yeh. *The food insecurity-obesity paradox: a review of the literature and the role food stamps may play*. J Am Diet Assoc, 2007. **107**(11): p. 1952-1961.
7. Larson, N.I. and M.T. Story. *Food insecurity and weight status among U.S. children and families: a review of the literature*. Am J Prev Med, 2011. **40**(2): p. 166-173.

8. Castillo, D.C., et al. *Inconsistent Access to Food and Cardiometabolic Disease: The Effect of Food Insecurity*. Curr Cardiovasc Risk Rep, 2012. **6**(3): p. 245-250.
9. Kendall, A., C.M. Olson, and E.A. Frongillo, Jr. *Relationship of hunger and food insecurity to food availability and consumption*. J Am Diet Assoc, 1996. **96**(10): p. 1019-24; quiz 1025-1026.
10. Frongillo, E.A., Olson, C.M., Rauschenbach, and B.S., Kendall, A. *Nutritional Consequences of Food Insecurity in a Rural New York State County*. Institute for Research on Poverty Discussion Paper, 1997. 1120-1197.
11. Bruening, M., et al. *Feeding a family in a recession: food insecurity among Minnesota parents*. Am J Public Health, 2012. **102**(3): p. 520-526.
12. Abel, S.C., Richards, M.H. *The Relationship Between Body Shape Satisfaction and Self-Esteem: An Investigation of Gender and Class Differences*. J of Youth and Adolescence, 1996. **25**(5): p. 691-703.
13. O'Dea, J.A. and Caputi, P. *Association between socioeconomic status, weight, age and gender, and the body image and weight control practices of 6- to 19-year-old children and adolescents*. Health Educ Res, 2001. **16**(5): p. 521-532.
14. Rogers, L., et al. *The relationship between socioeconomic status and eating-disordered behaviors in a community sample of adolescent girls*. Int J Eat Disord, 1997. **22**(1): p. 15-23.
15. Story, M., et al. *Ethnic/racial and socioeconomic differences in dieting behaviors and body image perceptions in adolescents*. Int J Eat Disord, 1995. **18**(2): p. 173-179.

16. Masheb, R.M., and Grilo, C.M. *Emotional overeating and its associations with eating disorder psychopathology among overweight patients with binge eating disorder*. Int J of Eat Disord, 2006. **39**(2): p. 141-146.
17. Heatherton, T.F., and Baumeister, R.F. *Binge eating as escape from self-awareness*. Psychological bulletin ,1991. **110**(1): p. 86.
18. Paxton, S.J., and Diggins J. *Avoidance coping, binge eating, and depression: An examination of the escape theory of binge eating*. Int J Eat Disord, 1997. **22**(1): p. 83-87.
19. Blumberg, S.J., Bialostosky, K., Hamilton, W.L., & Briefel, R.R. *The effectiveness of a short form of the household food security scale*. Am J of Public Health, 1999. **89**: p. 1231-34.
20. Fairburn, C.G. & Beglin, S.J. *Assessment of eating disorders: interview or self-report questionnaire?* Int J Eat Disord, 1994. **16**(4): p. 363–70.
21. Grilo, C.M., Masheb, R.M., Lozano-Blanco, C., & Barry, D.T. *Reliability of the Eating Disorder Examination in patients with binge eating disorder*. Int J Eat Disord, 2004. **35**(1): p. 80–5.
22. Grilo, C.M., Masheb, R.M., & Wilson, G.T. *A comparison of different methods for assessing the features of eating disorders in patients with binge eating disorder*. J Consulting and Clinical Psychology, 2001. **69**(2): p. 317–22.
23. Mond, J.M., Hay, P.J., Rodgers, B., Owen, C., & Beumont, P.J. *Validity of the Eating Disorder Examination Questionnaire (EDE-Q) in screening for eating*

- disorders in community samples*. Behavior Research and Therapy, 2004. **42**(5): p. 551-67.
24. Reas, D.L., Grilo, C.M., & Masheb, R.M. *Reliability of the Eating Disorder Examination-Questionnaire in patients with binge eating disorder*. Behavior Research and Therapy, 2006. **44**(1): p. 43-51.
 25. Beck, A.T. *Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation*. Clinical Psychology Review, 1988. **8**(1): p. 77-100.
 26. Spencer, E.A., Appleby, P.N., Davey, G.K., and Key, T.J. *Validity of self-reported height and weight in 4808 EPIC-Oxford participants*. Public Health Nutrition, 2002. **5**(4): p. 561-565.
 27. Strauss, R.S. *Comparison of measured and self-reported weight and height in a cross-sectional sample of young adults*. Int J Obesity & Related Metabolic Disorders, 1999. **23**(8): p. 904-909.
 28. *National Center for Education Statistics*. Institute of Education Sciences 2012; Available at: https://nces.ed.gov/programs/digest/d12/tables/dt12_008.asp Accessed April 15, 2014.
 29. Lorant, V., Deliege, D., Eaton, W., Robert, A., Philippot, P., & Ansseau, M. *Socioeconomic Inequalities in Depression: A Meta-Analysis*. Am J Epidemiology, 2003. **157**(2): p. 98-112.

APPENDIX- Survey Items

Demographics:

How old are you? (please type age in years)

What is your sex?

- ☐ Male
- ☐ Female

What is your Racial/Ethnic background?

- ☐ Black (non-Hispanic)
- ☐ Hispanic
- ☐ White
- ☐ Asian
- ☐ Other (please specify)

BMI:

How tall are you?

feet

inches

How much do you weigh now (in pounds)?

Food Insecurity:

In the past 12 months....

1. I couldn't afford to eat balanced meals
 - ☐ Often true
 - ☐ Sometimes true
 - ☐ Never true
2. The food that I bought just didn't last, and I didn't have money to get more
 - ☐ Often true
 - ☐ Sometimes true
 - ☐ Never true
3. In the last 12 months, did you (or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?
 - ☐ Yes
 - ☐ No
4. How often did this happen?
 - ☐ Almost every month
 - ☐ Some months but not every month
 - ☐ In only one or two months
5. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?
 - ☐ Yes
 - ☐ No
6. In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?
 - ☐ Yes
 - ☐ No

Shape Concern:

On how many days out of the PAST 28 DAYS...

Have you definitely wanted your stomach to be flat?

- ☐ No days
- ☐ 1-5 days
- ☐ 6-12 days
- ☐ 13-15 days
- ☐ 16-22 days
- ☐ 23-27 days
- ☐ Every day

Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example, reading, writing, TV, or following a conversation?

- ☐ No days
- ☐ 1-5 days
- ☐ 6-12 days
- ☐ 13-15 days
- ☐ 16-22 days
- ☐ 23-27 days
- ☐ Every day

Have you had a definite fear that you might gain weight or become fat?

- ☐ No days
- ☐ 1-5 days
- ☐ 6-12 days
- ☐ 13-15 days
- ☐ 16-22 days
- ☐ 23-27 days
- ☐ Every day

Have you felt fat?

- ☐ No days
- ☐ 1-5 days
- ☐ 6-12 days
- ☐ 13-15 days
- ☐ 16-22 days
- ☐ 23-27 days
- ☐ Every day

Has your shape influenced how you think about (judge) yourself as a person?

- ☐ No importance
- ☐
- ☐ Some importance
- ☐
- ☐ Moderate importance
- ☐
- ☐ Supreme importance

How dissatisfied have you felt about your shape?

- ☐ Not at all
- ☐
- ☐ Slightly
- ☐
- ☐ Moderately
- ☐
- ☐ Markedly

How uncomfortable have you felt seeing your body; for example, in the mirror, in shop window reflections, while undressing or taking a bath or shower?

- ☐ Not at all
- ☐
- ☐ Slightly
- ☐
- ☐ Moderately
- ☐
- ☐ Markedly

How uncomfortable have you felt about others seeing your body; for example, in communal changing rooms, when swimming or wearing tight clothes?

- ☐ Not at all
- ☐
- ☐ Slightly
- ☐
- ☐ Moderately
- ☐
- ☐ Markedly

Weight Concern:

Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example, reading, watching TV, or following a conversation?

- ☐ No days
- ☐ 1-5 days
- ☐ 6-12 days
- ☐ 13-15 days
- ☐ 16-22 days
- ☐ 23-27 days
- ☐ Every day

Have you had a strong desire to lose weight?

- ☐ No days
- ☐ 1-5 days
- ☐ 6-12 days
- ☐ 13-15 days
- ☐ 16-22 days
- ☐ 23-27 days
- ☐ Every day

Has your weight influenced how you think about (judge) yourself as a person?

- ☐ No importance
- ☐
- ☐ Some importance
- ☐
- ☐ Moderate importance
- ☐
- ☐ Supreme importance

How much would it upset you if you had to weigh yourself once a week for the next four weeks?

- ☐ Not at all
- ☐
- ☐ Slightly
- ☐
- ☐ Moderately
- ☐
- ☐ Markedly

How dissatisfied have you felt about your weight?

- ☐ Not at all
- ☐
- ☐ Slightly
- ☐
- ☐ Moderately
- ☐
- ☐ Markedly

Binge Eating:

(Episode: time when you felt you ate what other people would regard as an unusually large amount of food given the circumstances; Time period: over the past four weeks)

During how many of these episodes did you have a sense of having lost control over your eating?

Anger:

On how many of the PAST 28 DAYS have you eaten an unusually large amount of food given the circumstances in response to feelings of...

- ☐ ANGER (upset, frustrated, furious)?

Guilt:

On how many of the PAST 28 DAYS have you eaten an unusually large amount of food given the circumstances in response to feelings of...

- ☐ GUILT (regret, remorse, shame)?

Sadness:

On how many of the PAST 28 DAYS have you eaten an unusually large amount of food given the circumstances in response to feelings of...

- ☐ SADNESS (blue, down, depressed)?

BDI:

In this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling during the PAST WEEK, INCLUDING TODAY.

1.

- ☐ I do not feel sad.
- ☐ I feel sad.
- ☐ I am sad all the time and I can't snap out of it.
- ☐ I am so sad or unhappy that I can't stand it.

2.

- ☐ I am not particularly discouraged about the future.
- ☐ I feel discouraged about the future.
- ☐ I feel I have nothing to look forward to.
- ☐ I feel that the future is hopeless and that things cannot improve.

3.

- ☐ I do not feel like a failure.
- ☐ I feel I have failed more than the average person.
- ☐ As I look back on my life, all I can see is a lot of failures.
- ☐ I feel I am a complete failure as a person.

4.

- ☐ I get as much satisfaction out of things as I used to.
- ☐ I don't enjoy things the way I used to.
- ☐ I don't get real satisfaction out of anything anymore.
- ☐ I am dissatisfied with everything.

5.

- ☐ I don't feel particularly guilty.
- ☐ I feel guilty a good part of the time.
- ☐ I feel quite guilty most of the time.
- ☐ I feel guilty all of the time.

6.

- ☐ I don't feel I am being punished.
- ☐ I feel I may be punished.
- ☐ I expect to be punished.
- ☐ I feel I am being punished.

7.

- ☐ I don't feel disappoint in myself.
- ☐ I am disappointed in myself.
- ☐ I am disgusted with myself.
- ☐ I hate myself.

8.

- ☐ I don't feel I am any worse than anybody else.
- ☐ I am critical of myself for my weaknesses or mistakes.
- ☐ I blame myself all the time for my faults.
- ☐ I blame myself for everything bad that happens.

9.

- ☐ I don't have any thoughts of killing myself.
- ☐ I have thought of killing myself, but I would not carry them out.
- ☐ I would like to kill myself.
- ☐ I would kill myself if I had the chance.

10.

- ☐ I don't cry any more than usual.
- ☐ I cry more now than I used to.
- ☐ I cry all the time now.
- ☐ I used to be able to cry, but now I can't cry even that I want to.

11.

- ☐ I am no more irritated now that I ever am.
- ☐ I get annoyed or irritated more easily than I used to.
- ☐ I feel irritated all the time now.
- ☐ I don't get irritated at all by the things that used to irritate me.

12.

- ☐ I have not lost interest in other people.
- ☐ I am less interested in other people than I used to be.
- ☐ I have lost most of my interest in other people.
- ☐ I have lost all of my interest in other people.

13.

- ☐ I make decisions about as well as I ever could.
- ☐ I put off making decisions more than I used to.
- ☐ I have greater difficulty in making decisions than before.
- ☐ I can't make decisions at all anymore.

14.

- ☐ I don't feel I look any worse than I used to.
- ☐ I am worried that I am looking old and unattractive.
- ☐ I feel that there are permanent changes in my appearance that make me look unattractive.
- ☐ I believe that I look ugly.

15.

- ☐ I can work about as well as before.
- ☐ It takes an extra effort to get started at doing something.
- ☐ I have to push myself very hard to do anything.
- ☐ I can't do any work at all.

16.

- ☐ I can sleep as well as usual.
- ☐ I don't sleep as well as I used to.
- ☐ I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
- ☐ I wake up several hours earlier than I used to and I cannot get back to sleep.

17.

- ☐ I don't get more tired than usual.
- ☐ I get tired more easily than I used to.
- ☐ I get tired from doing almost anything.
- ☐ I am too tired to do anything.

18.

- ☐ My appetite is no worse than usual.
- ☐ My appetite is not as good as it used to be.
- ☐ My appetite is much worse now.
- ☐ I have no appetite at all anymore.

19.

- ☐ I haven't lost much weight, if any, lately.
- ☐ I have lost more than 5 pounds.
- ☐ I have lost more than 10 pounds.
- ☐ I have lost more than 15 pounds.

20.

- ☐ I am no more worried about my health than usual.
- ☐ I am worried about physical problems, such as aches or upset stomach.
- ☐ I am very worried about my health, and it's hard to think of much else.
- ☐ I am so worried about my physical problems that I cannot think about anything else.

21.

- ☐ I have not noticed any recent change in my interest in sex.
- ☐ I am less interested in sex than I used to be.
- ☐ I am much less interested in sex now.
- ☐ I have lost interest in sex completely.